THE STATE OF TEXAS §

COUNTY OF Montgomery §

This is to certify that the above and foregoing is a true and correct copy of a Franchise Agreement adopted by the City Council/City Commission of the City of Conroe, Texas, at a regular meeting held on the 25 day of June, 2009.

Jo Ann M. Green
City Clerk

50

August 25, 2008

City of

Dear Sir or Madam:

Enclosed is Entergy Texas, Inc.'s annual franchise fee payment for the twelve months ending for the City of .

KWh Delivered Within the City During the Twelve Months Ended	XXXXXX
Rate per KWH of electricity	$.XXXX
Franchise Fee	$XXXXXX

The information given in this statement has been taken from the books of the company and is, to the best of my knowledge and belief, true and correct.

Please contact at (504) 576-4337 or me if you have any questions or need additional information.

Sincerely,

Tax Officer
(504) 576-4407

Please acknowledge receipt of payment by signing the attached copy of this notification and returning it in the envelope provided.

Received by: _____ Date: _____

ATTACHMENT B

ENTERGY TEXAS, INC.
C/O Entergy Services, Inc.
Attn: Tax Department
P.O. Box 61000
New Orleans, LA 70161
(504) 576-4407

Incremental Franchise Fee Calculation
For the Period through

(CITY)

KWH of electricity delivered by the utility to each retail customer whose consuming facility's point of delivery is located within the municipality's boundaries— through

Incremental Rate per KWH of electricity

Total Gross Incremental Franchise Fee $

Deductions:

Texas Gross Receipts Tax .0XXXX $

Total Net Incremental Franchise Fee $

Payment will be wired on

The information given in this statement has been taken from the books of the company and is, to the best of my knowledge and belief, true and correct.

Should you have any questions, please contact Lynne Roberts (504) 576-6137 or me.

Director – State and Local Taxes

Please acknowledge receipt of payment by signing and returning in enclosed envelope.

Received by signature Print Name Date

EXHIBIT B

53

SECTION III RATE SCHEDULE

ENTERGY TEXAS, INC. Electric Service	Sheet No.: 100 Effective Date: Revision: 0 Supersedes: New Schedule
SCHEDULE FFCO	Schedule Consists of: One Sheet

INCREMENTAL CONROE FRANCHISE FEE RECOVERY RIDER
(MUNICIPAL RATE SCHEDULE)

I. PURPOSE

This Incremental Conroe Franchise Fee Recovery Rider ("Rider FFCO") defines the procedure by which Entergy Texas, Inc. ("Company") shall implement rates for recovery of incremental Franchise Fee costs paid to the City of Conroe. The purpose of this Rider is to provide a mechanism for recovery of incremental franchise fee costs not included in the Company's last general rate case proceeding.

II. APPLICABILITY

This rider is applicable to all electric service rendered by Company to all retail customers whose consuming facilities' points of delivery are located within the City Limits of Conroe, Texas, under all retail rate schedules, whether metered or unmetered, subject to the jurisdiction of the PUCT.

III. INCREMENTAL FRANCHISE FEE RATE

The rate associated with this Surcharge Tariff shall be $0.0014101 for every kilowatt-hour billed by the Company to its retail customers inside the city limits of Conroe.

IV. TERM

This Rider FFCO shall remain in effect until it expires or ceases under the terms of the Franchise Agreement entered into contemporaneously with this Tariff or until it is modified or superseded by a subsequent franchise agreement with the City of Conroe.

CERTIFICATE FOR ORDINANCE

I.

On the 8th day of October, 2009, the City Council of the City of Conroe, Texas, consisting of the following qualified members, to-wit: **Webb K. Melder, Mayor; Jerry Streater, Mayor Pro Tem, Council Members Jay Ross Martin, Jim Gentry, Toby Powell and Marsha Porter** did convene in public session in the Council Chambers of the City Hall at 300 West Davis in Conroe, Texas. The roll being first called, a quorum was established, all members being present. The Meeting was open to the public and public notice of the time, place and purpose of the Meeting was given, all as required by Chapter 551, Texas Government Code.

II.

WHEREUPON, AMONG OTHER BUSINESS transacted, the Council considered adoption of the following written Ordinance, to-wit:

ORDINANCE NO. 1936-09

AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF CONROE, TEXAS, AMENDING THE FRANCHISE AGREEMENT BETWEEN THE CITY OF CONROE, TEXAS AND ENTERGY TEXAS, INC.; PROVIDING FOR EFFECTIVE DATE AND OTHER MATTERS

III.

Upon motion of Council Member Martin, seconded by Council Member Porter, all members present voted for adoption of the Ordinance, except the following: n/a. A majority of those Council Members present having voted for adoption, the presiding officer declared the Ordinance passed and adopted.

A true, full and correct copy of the Ordinance adopted at the Meeting is attached to and follows this Certificate.

SIGNED AND SEALED this 8th day of October, 2009.

MARLA J. PORTER, City Secretary

ORDINANCE NO. 1936-09

AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF CONROE, TEXAS, AMENDING THE FRANCHISE AGREEMENT BETWEEN THE CITY OF CONROE, TEXAS AND ENTERGY TEXAS, INC.; PROVIDING FOR EFFECTIVE DATE AND OTHER MATTERS

* * * * * * * * * *

WHEREAS, by Ordinance No. 1910-09 dated June 25, 2009, the City Council of the City of Conroe did approve on second reading and finally adopt a franchise agreement with Entergy Texas, Inc.; and

WHEREAS, before final adoption the franchise agreement was amended to incorporate certain changes agreed between the parties; and

WHEREAS, the language of Section 10 of the franchise agreement was inadvertently altered from the language intended by the parties as approved on first reading on May 14, 2009; and

WHEREAS, the parties desire to amend the franchise agreement to conform to the intent of the parties as reflected by the text of Section 10 as approved on first reading:

NOW, THEREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF CONROE, TEXAS:

Section 1. Section 10 of the Entergy Texas, Inc. franchise agreement approved and adopted by the City of Conroe, Texas pursuant to Ordinance No. 1910-09 and accepted by Entergy Texas, Inc. on June 30, 2009, (hereinafter the "Franchise Agreement") is hereby amended in its entirety to read as follows:

Section 10: As compensation to City for the use and occupancy of its Public Rights-of-Way, and in consideration for the other rights and privileges herein granted, Company agrees to pay to the City and City agrees to accept from Company on September 1, 2009, and on each September 1 thereafter occurring during the continuance of this agreement, a fee equal to $0.0017561 ("Base Franchise Fee Factor") multiplied times the number of kilowatt hours delivered during the period commencing on July 1 of the previous calendar year and ending on June 30 of the calendar year in which the payment is due, inclusive, by Company to retail customers whose consuming facility's point of delivery is within the City's boundaries. Each payment herein

provided shall compensate the City for the use of its Public Rights-of-Way by the Company for the twelve months period commencing upon, and extending from July 1 of the calendar year that such particular payment is actually due and paid.

At the time of each annual September 1 payment, Company shall also submit to the City a sworn statement showing the following: (i) its kilowatt hour sales delivered in total to the retail customers whose consuming facilities' points of delivery are located within the City's boundaries for the preceding year upon which the franchise fee payments are calculated; and (ii) a calculation of the annual Base Franchise Fee payment. The statement shall be in a form substantially similar to attachment "A."

Provided that if, subsequent to the effective date of this Agreement, any Texas Municipality within the Company's service area negotiates with Company a methodology for calculation of the payment of the franchise different than the Base Franchise Fee kWh factor methodology used in this section and the Incremental Franchise Fee kWh factor methodology used in Section 11(A), the City will have the right after reasonable notice to utilize the same methodology.

The parties agree that the payments due under this franchise are reasonable and necessary and that the parties shall use their best efforts to enable Company to recover these payments through its electric rates.

Section 2. The amendment approved and authorized by this ordinance shall be effective when accepted in writing by Entergy Texas, Inc. The written acceptance shall be made and given in substantially the same form and manner as provided by Section 18 of the Franchise Agreement.

Section 3. The meetings at which this ordinance was considered, approved and adopted was conducted in strict compliance with the Texas Open Meetings Act, Texas Government Code Chapter 551.

Section 4. This ordinance shall be effective immediately upon second reading and final adoption.

PASSED AND APPROVED on first reading on the 13th day of August, 2009.

PASSED AND APPROVED on second and final reading on the 8th day of October, 2009.

WEBB K. MELDER, Mayor

APPROVED AS TO FORM:

MARCUS L. WINBERRY, City Attorney

ATTEST:

MARLA J. PORTER, City Secretary

	Route No 1 A,C1,BD,C3,F,I1,I2,M,R1,BB,U2,Y1,Y2,X,W, AC,AG,AK,AP,AT,AX			Route No 2 A,C1,BD,C3,F,I1,I2,M,R1,BB,U2,Z,AB,AO			Route No 3 A,B,BI,BK,BN,L2,N,P1,AZ,BF,P4,S1,BG,S3, AD,AI,AR,AY			Route No 4 A,C1,BD,C3,F,I1,I2,M,R1,BB,U2,Y1,Y2,X,AA, AB,AO		
	Transmission Facilities	Substation Facilities	Total	Transmission Facilities	Substation Facilities	Total	Transmission Facilities	Substation Facilities	Total	Transmission Facilities	Substation Facilities	Total
Right-of-way and Land Acquisition	$7,884,568		$7,884,568	$17,080,897		$17,080,897	$25,216,325		$25,216,325	$15,354,956		$15,354,956
Engineering and Design (Utility)	$71,250	$658,327	$729,577	$71,250	$658,327	$729,577	$71,250	$658,327	$729,577	$71,250	$658,327	$729,577
Engineering and Design (Contract)	$5,798,113		$5,798,113	$6,697,455		$6,697,455	$6,138,942		$6,138,942	$6,581,985		$6,581,985
Procurement of Material and Equipment (including stores)	$11,113,074	$18,173,817	$29,286,891	$12,602,366	$18,173,817	$30,776,183	$13,811,720	$18,173,817	$31,985,537	$12,580,553	$18,173,817	$30,754,370
Construction of Facilities (Utility)	$216,289		$216,289	$243,695		$243,695	$226,731		$226,731	$240,450		$240,450
Construction of Facilities (Contract)	$15,600,585	$6,517,022	$22,117,607	$17,924,804	$6,517,022	$24,441,826	$19,058,829	$6,517,022	$25,575,851	$17,777,628	$6,517,022	$24,294,650
Other (all costs not included in the above categories)	$6,890,590	$5,040,237	$11,930,827	$9,209,083	$5,040,237	$14,249,320	$9,936,484	$5,040,237	$14,976,721	$8,559,762	$5,040,237	$13,599,999
Estimated Total Cost	$47,574,469	$30,389,403	$77,963,872	$63,829,550	$30,389,403	$94,218,953	$74,460,281	$30,389,403	$104,849,684	$61,166,584	$30,389,403	$91,555,987

	Route No 5 A,C1,BD,C3,F,I1,I2,M,O,N,P1,AZ,BF,P4,T,X, W,AC,AG,AK,AP,AT,AX			Route No 6 A,C1,BD,C3,F,I1,BL,M,R1,BB,U2,Y1,Y2,X,AA, AB,AO			Route No 7 A,B,BI,BK,BN,L2,N,Q,U1,U2,Y1,Y2,X,W,AC, AG,AK,AP,AT,AX			Route No 8 A,B,BI,BK,BN,L2,N,P1,AZ,BF,P4,S1,BG,S3, V,AC,AG,AK,AP,AT,AX		
	Transmission Facilities	Substation Facilities	Total	Transmission Facilities	Substation Facilities	Total	Transmission Facilities	Substation Facilities	Total	Transmission Facilities	Substation Facilities	Total
Right-of-way and Land Acquisition	$14,968,967		$14,968,967	$19,243,046		$19,243,046	$13,415,385		$13,415,385	$20,840,766		$20,840,766
Engineering and Design (Utility)	$71,250	$658,327	$729,577	$71,250	$658,327	$729,577	$71,250	$658,327	$729,577	$71,250	$658,327	$729,577
Engineering and Design (Contract)	$6,180,598		$6,180,598	$6,880,493		$6,880,493	$6,001,790		$6,001,790	$6,133,042		$6,133,042
Procurement of Material and Equipment (including stores)	$12,856,920	$18,173,817	$31,030,737	$13,939,538	$18,173,817	$32,113,355	$12,562,403	$18,173,817	$30,736,220	$13,597,430	$18,173,817	$31,771,247
Construction of Facilities (Utility)	$228,040		$228,040	$249,632		$249,632	$222,540		$222,540	$226,564		$226,564
Construction of Facilities (Contract)	$17,220,804	$6,517,022	$23,737,826	$19,135,484	$6,517,022	$25,652,506	$18,169,114	$6,517,022	$24,686,136	$18,877,429	$6,517,022	$25,394,451
Other (all costs not included in the above categories)	$8,251,960	$5,040,237	$13,292,197	$9,403,300	$5,040,237	$14,443,537	$8,434,546	$5,040,237	$13,474,783	$9,626,729	$5,040,237	$14,666,966
Estimated Total Cost	$59,778,539	$30,389,403	$90,167,942	$68,922,743	$30,389,403	$99,312,146	$58,877,028	$30,389,403	$89,266,431	$69,373,210	$30,389,403	$99,762,613

	Route No 9 A,B,BI,BK,BN,L2,N,P1,AZ,BC,Y2,X,W,AC, AG,AK,AP,AT,AX			Route No 10 A,C1,BD,C3,F,I1,BL,K1,L1,L2,N,P1,P2,BE, BF,P4,S1,BG,S3,AD,AI,AN1,BH,AQ,AU,AV, AX			Route No 11 A,C1,BD,C3,F,I1,BL,K1,L1,L2,N,P1,P2,BE, BF,P4,S1,BG,S3,AD,AF,AH,AL,AP,AT,AX			Route No 12 A,C1,BD,C3,F,G,H1,H2,H3,BJ,BK,BN,L2,N, P1,P2,BE,BF,P4,S1,BG,S3,AD,AI,AN1,BH, AQ,AU,AV,AX		
	Transmission Facilities	Substation Facilities	Total	Transmission Facilities	Substation Facilities	Total	Transmission Facilities	Substation Facilities	Total	Transmission Facilities	Substation Facilities	Total
Right-of-way and Land Acquisition	$15,751,473		$15,751,473	$28,547,625		$28,547,625	$28,139,758		$28,139,758	$26,857,238		$26,857,238
Engineering and Design (Utility)	$71,250	$658,327	$729,577	$71,250	$658,327	$729,577	$71,250	$658,327	$729,577	$71,250	$658,327	$729,577
Engineering and Design (Contract)	$5,798,745		$5,798,745	$6,629,030		$6,629,030	$6,620,272		$6,620,272	$6,415,219		$6,415,219

Procurement of Material and Equipment (including stores)	$12,161,641	$18,173,817	$30,335,458	$15,494,848	$18,173,817	$33,668,665	$15,174,539	$18,173,817	$33,348,356	$15,136,860	$18,173,817	$33,310,677
Construction of Facilities (Utility)	$216,326		$216,326	$241,822		$241,822	$241,573		$241,573	$235,226		$235,226
Construction of Facilities (Contract)	$17,459,767	$6,517,022	$23,976,789	$19,590,507	$6,517,022	$26,107,529	$19,379,229	$6,517,022	$25,896,251	$19,528,373	$6,517,022	$26,045,395
Other (all costs not included in the above categories)	$8,511,587	$5,040,237	$13,551,824	$10,455,180	$5,040,237	$15,495,417	$10,611,018	$5,040,237	$15,651,255	$10,524,461	$5,040,237	$15,564,698
Estimated Total Cost	$59,970,789	$30,389,403	$90,360,192	$81,030,262	$30,389,403	$111,419,665	$80,237,639	$30,389,403	$110,627,042	$78,768,627	$30,389,403	$109,158,030

	Route No 13 A,B,D,F,I1,I2,M,R1,BB,U2,Y1,Y2,X,W,AC,AG, AK,AP,AT,AX			Route No 14 A,B,BI,BK,BM,H5,K1,M,R1,BB,U2,Y1,Y2,X, W,AC,AG,AK,AP,AT,AX		
	Transmission Facilities	Substation Facilities	Total	Transmission Facilities	Substation Facilities	Total
Right-of-way and Land Acquisition	$7,993,158		$7,993,158	$10,326,744		$10,326,744
Engineering and Design (Utility)	$71,250	$658,327	$729,577	$71,250	$658,327	$729,577
Engineering and Design (Contract)	$5,770,022		$5,770,022	$6,044,500		$6,044,500
Procurement of Material and Equipment (including stores)	$11,045,114	$18,173,817	$29,218,931	$12,419,484	$18,173,817	$30,593,301
Construction of Facilities (Utility)	$215,425		$215,425	$223,859		$223,859
Construction of Facilities (Contract)	$15,516,999	$6,517,022	$22,034,021	$18,104,262	$6,517,022	$24,621,284
Other (all costs not included in the above categories)	$6,808,638	$5,040,237	$11,848,875	$8,075,868	$5,040,237	$13,116,105
Estimated Total Cost	$47,420,606	$30,389,403	$77,810,009	$55,265,966	$30,389,403	$85,655,369

[redacted]

Burns & McDonnell
SINCE 1898

Environmental Assessment and Alternative Route Analysis

for the

Ponderosa to Grimes 230kV Transmission Line Project

Entergy

Entergy Texas

Project No. 71136

August 2013

[redacted]

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Environmental Assessment and Alternative Route Analysis

prepared for

Entergy Texas

August 2013

Project No. 71136

prepared by

Burns & McDonnell Engineering Company, Inc.
Dallas, Texas

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C03

LIST OF TABLES

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LIST OF FIGURES

ACRONYMS AND ABBREVIATIONS

ACSS	Aluminum Conductor Steel Supporting
AM	Amplitude Modulation
Amps	Amperes
BTS	Bureau of Transportation Statistics
Burns & McDonnell	Burns & McDonnell Engineering Company
CB	Citizens Band Radio
CCN	Certificate of Convenience and Necessity
CR	County Road
Entergy	Entergy Texas
ESSS	Ecologically Significant Stream Segment
ETI	Entergy Texas Inc.
EPA	Environmental Protection Agency
FAA	Federal Aviation Administration
FCC	Federal Communications Commission
FEMA	Federal Emergency Management Agency
FM	Frequency Modulation/ Farm-to-Market
ft	Feet/Foot
GIS	Geographic Information System
HOA	Homeowners Association
HPA	High Probability Area
ISD	Independent School District
KCMIL	1000 Circular Mils
kV	Kilovolt
MVA	Mega-volt Amps
NAIP	National Agriculture Imagery Program
NASS	National Agricultural Statistics Service
NESC	National Electrical Safety Code
NHPA	National Historic Preservation Act
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetland Inventory
PUCT	Public Utility Commission of Texas
RCT	Railroad Commission of Texas
ROW	Right-of-Way
SAL	State Archaeological Landmarks
SH	State Highway
SWPPP	Storm Water Pollution Prevention Plan
TARL	Texas Archeological Research Laboratory
THC	Texas Historical Commission
TPWD	Texas Parks & Wildlife Department
TV	Television
TWDB	Texas Water Development Board
TxNDD	Texas Natural Diversity Database
USACE	U.S. Army Corps of Engineers
USCB	U.S. Census Bureau
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

1.0 PROJECT DESCRIPTION

1.1 Scope of the Project

Entergy Texas proposes to design and construct a new 230 kilovolt (kV) single circuit transmission line. The proposed transmission line will begin at the Ponderosa Switching Station, which is currently under construction and will be located inside Loop 336 just east of Sgt. Ed Holcomb Blvd. on the southwest side of Conroe, Texas in Montgomery County. The line will extend from the Ponderosa Switching Station to the Grimes Substation located on Co. Rd. 240 north of Shiro, Texas in Grimes, County. As part of that construction, a portion of existing line could be rebuilt to connect the Grimes Substation and Ponderosa Switching Station (Figure 1-1).

Entergy retained Burns & McDonnell Engineering Company, Inc. (Burns & McDonnell) to prepare an Environmental Assessment and Alternative Route Analysis to support their application for a Certificate of Convenience and Necessity (CCN). This report has been prepared to provide information and address requirements of Section 37.056 (c)(4)(A)-(D) of the Texas Utilities Code, the Public Utility Commission of Texas (PUCT) CCN application form and PUCT Substantive Rule § 25.101. This report may also be used in support of any additional local, state, or federal permitting activities that may be required for Entergy's proposed project.

1.2 Purpose and Need for the Project

Entergy Texas currently serves customers, both residential and commercial, throughout Texas. The southeastern Texas region, surrounding the Houston area, has experienced substantial growth over the last 20 years. This project is designed to address the forecasted transmission needs of Entergy Texas Inc's (ETI) service territory in the Western Region. Construction of the project would provide a new 230kV transmission path between the 345kV transmission source and generation in the Grimes area and The Woodlands and Conroe load centers which is needed to continue to reliably transfer electricity between these areas to ETI's customers in the Western Region area. This project would help prevent line overloading and violations of the North American Electric Reliability Council ("NERC") Planning Standards. Considering the present transmission system topology and firm resource contracts in place, along with planned network resource additions and planned approved transmission upgrades, ETI has determined that the 230kV line would be necessary by the summer of 2018 in order to continue to provide adequate and reliable service to those customers served in the Western Region area.

OVERSIZED DOCUMENT(S)

TO VIEW

OVERSIZED DOCUMENT(S)

PLEASE GO TO

CENTRAL RECORDS

(512) 936-7180

Steady state load flow analysis indicates that the loss of various elements in the Western Region area will result in another element overloading. Loss of the Grimes to Bentwater 138kV line coupled with the loss of generation at Lewis Creek (either Lewis Creek unit 1 or unit 2) will result in the Grimes to Mt. Zion to Huntsville 138kV line to overload. Loss of the Grimes to Mt. Zion 138kV line coupled with the loss of generation at Lewis Creek (either Lewis Creek unit 1 or unit 2) will result in the Grimes to Bentwater 138kV line to overload. Loss of either Grimes 345-138kV autotransformers coupled with the loss of generation at Lewis Creek (either Lewis Creek unit 1 or unit 2) will result in the remaining Grimes autotransformer to overload. These overloads violate NERC reliability standard TPL-001-04 which requires that this contingency (P3-2) not interrupt Firm Transmission service or cause non-consequential load loss. Load flow on these lines is primarily driven by the increase in flows from the Grimes area towards The Woodlands/Conroe load centers through the underlying 138kV transmission system. Load in the Western Region is forecasted to grow at 1.9% per year.

1.3 Description of Proposed Construction

1.3.1 Transmission Line Design

Entergy has proposed to use a single pole concrete and steel single circuit line constructed to a minimum rating of 1957 amperes (amps), 1272 1000 circular mils (KCMIL) aluminum conductor steel supported (ACSS) with conductor rating of 780 mega volt-amps (MVA) from the Ponderosa Switching Station, currently under construction, to the existing Grimes Substation. Design criteria will be in compliance with applicable statutes, the appropriate edition of the National Electrical Safety Code (NESC), Entergy's Transmission Line Design Criteria and acceptable engineering design practice. Structures will be supported by foundations that are appropriate and compatible to the structure design.

1.3.2 Right-of-Way Requirements

The proposed right-of-way (ROW) width for this project will be approximately 125 feet (ft) for alternative routes in new ROW and 100 ft for alternative routes that utilize existing ROW. The proposed transmission line will be located in the centerline of the ROW. Additional ROW may be required at line angles and at dead-ends.

1.3.3 Clearing Requirements

The proposed transmission line project will be constructed on a mix of land that includes land that has already been cleared for existing ROW or a combination of some cropland, pastureland, and land that is wooded. In areas that are already cleared for current ROW or cropland and pastureland, very little or no clearing will be required. In wooded areas, clearing of the ROW will be necessary. In these areas, all

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trees, brush, and undergrowth within the ROW, except for low growing vegetation, will be removed. Any required clearing will be conducted using techniques that are appropriate to the terrain and vegetation conditions and following all applicable local, state, and federal regulations pertaining to environmental protection.

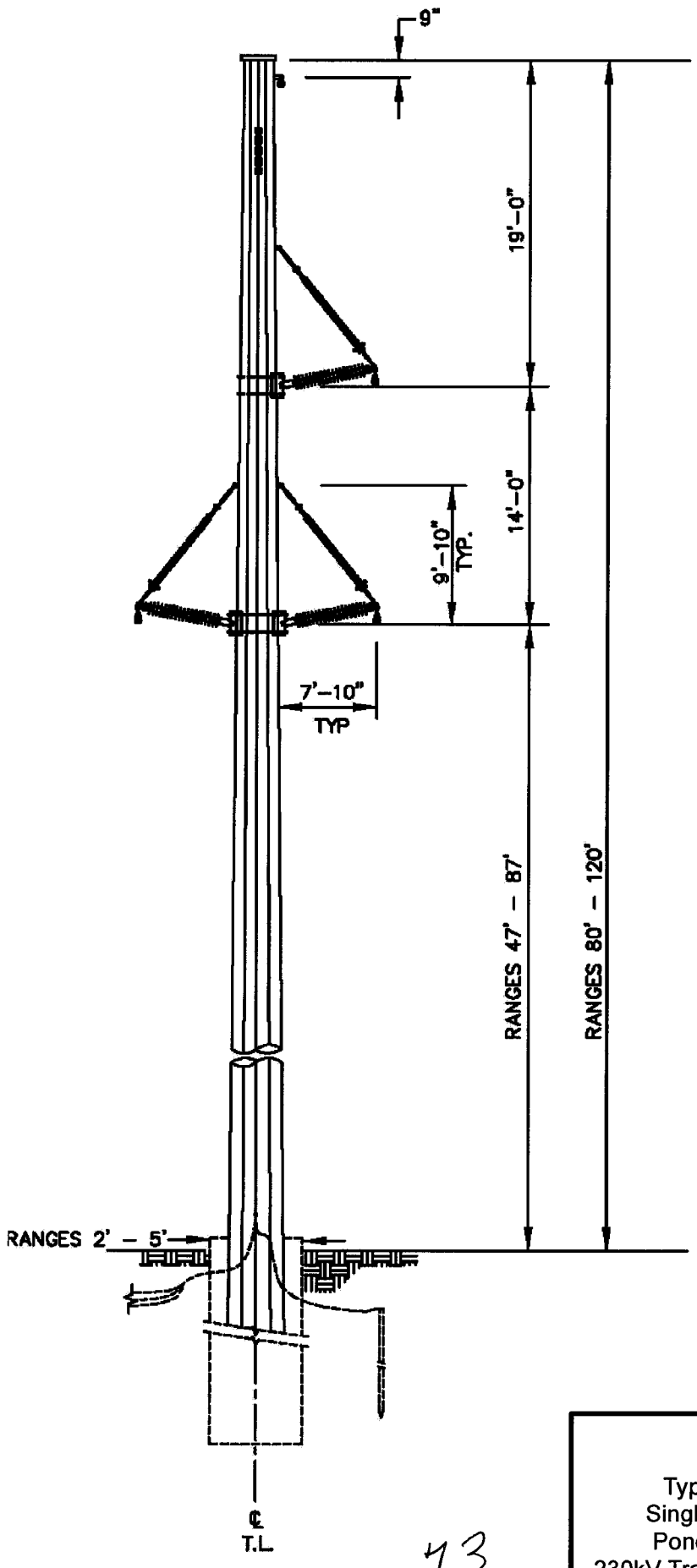

Figure 1-2
Typical Steel 230kV
Single Circuit Structure
Ponderosa To Grimes
230kV Transmission Line Project

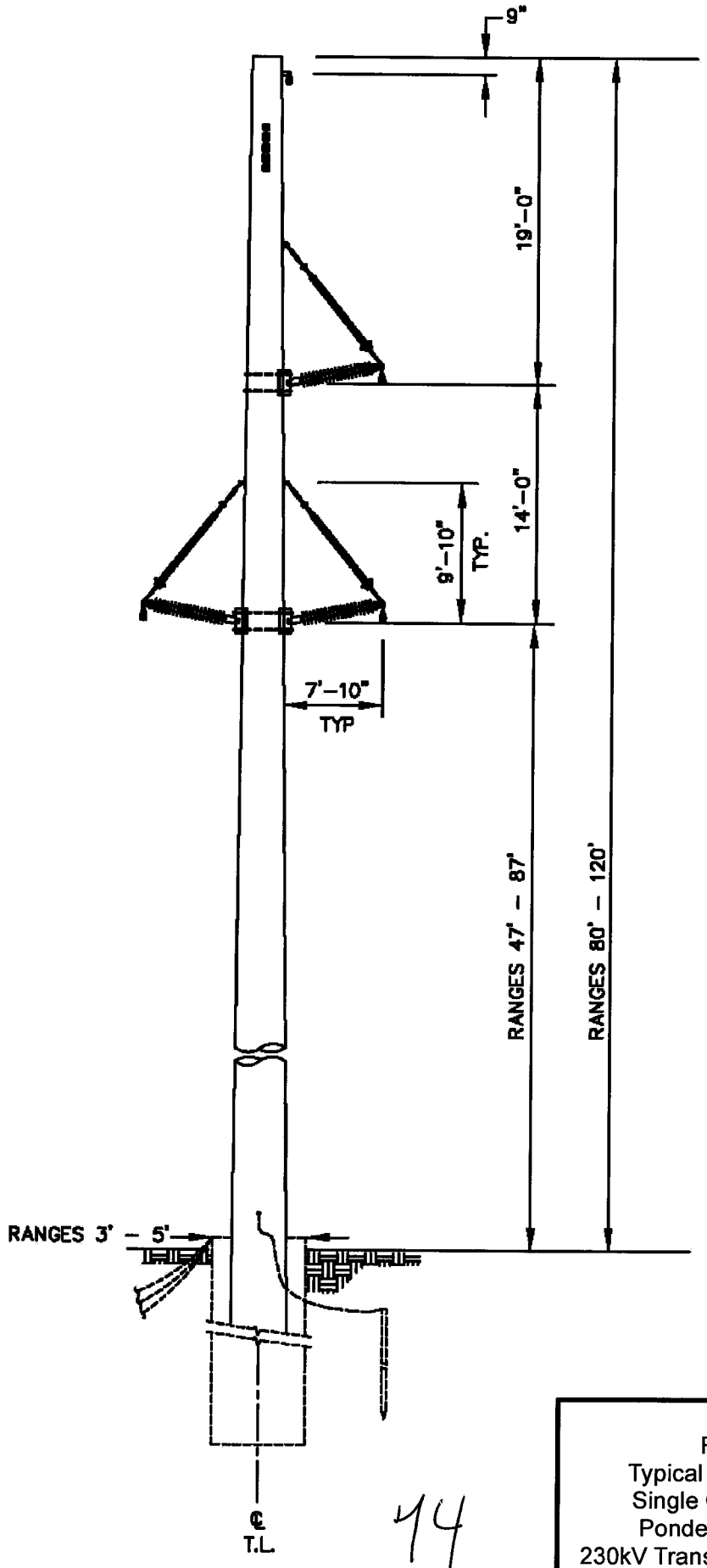

Figure 1-3
Typical Concrete 230kV
Single Circuit Structure
Ponderosa To Grimes
230kV Transmission Line Project

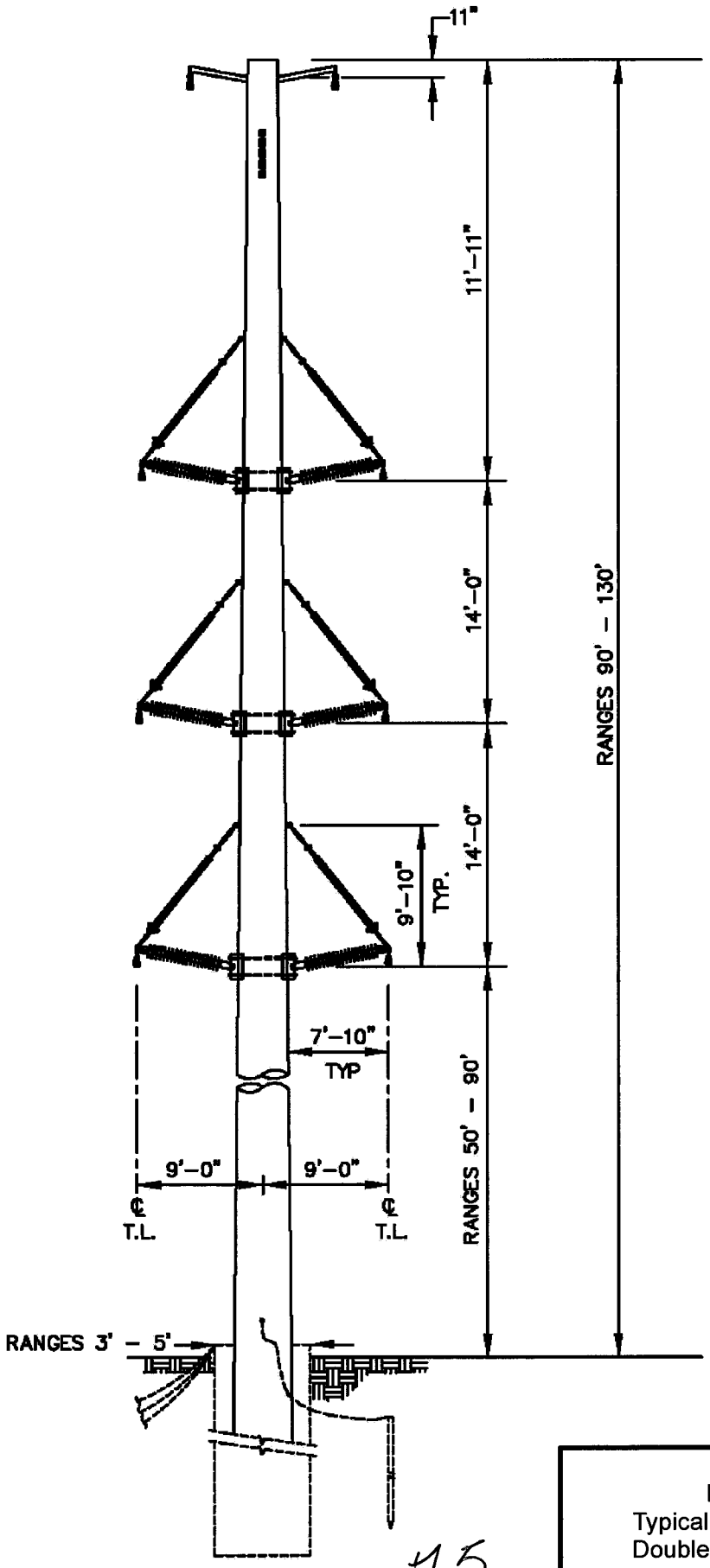

Figure 1-4
Typical Concrete 230kV
Double Circuit Structure
Ponderosa To Grimes
230kV Transmission Line Project

1.3.4 Support Structure Assembly and Erection

The first step in structure assembly and erection will be establishment of a solid foundation support system. Pending further soil investigations and confirmation of initial design assumptions, it is anticipated that all foundation construction will begin with auger drilling of a cylindrical shaft in the soil of appropriate diameter and depth to provide necessary support to the structure. For direct-embedded monopoles, the pole will be centered in this cylindrical shaft and the annulus between the monopole and the shaft will be backfilled with either crushed rock or concrete to create a strong foundation for the structure. For base-plated monopoles, an anchor bolt "cage" will be placed in the shaft and the shaft will be filled with concrete to create a sturdy concrete foundation for the structure. Once this foundation has been constructed for each structure type, the remaining structure will be assembled and erected on top of this foundation. Equipment required for this construction will likely include a combination of cranes, trucks, and augers. Equipment will be tired or tracked according to the requirements of terrain and weather conditions.

1.3.5 Conductor Stringing

Once a series of support structures have been erected along the transmission line, the conductor stringing phase can begin. Specialized equipment will be attached to insulators that will properly support and protect the conductor during the pulling, tensioning, and sagging operations. Once the conductors and shield wire are pulled in place, and tension and sag have been verified, suspension or dead-end units are installed at each attachment point to maintain conductor position. Conductor stringing will continue until the transmission line construction is complete.

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2.0 ROUTE IDENTIFICATION METHODOLOGY

The objective of this study was to identify and evaluate alternative transmission line routes for Entergy's proposed 230kV transmission line project from the Ponderosa Switching Station to the Grimes Substation. Throughout this report the terms "environmental" or "environment" shall include the human environment as well as the natural environment. Burns & McDonnell used a comprehensive transmission line routing and evaluation methodology to identify and evaluate alternative transmission line routes. Methods used to identify and evaluate potential routes were in accordance with Section 37.056 (c)(4)(A)-(D) of the Texas Utilities Code, the PUCT's CCN application form and PUCT Substantive Rule § 25.101.

The following sections provide a description of the process that consisted of study area delineation, data collection, constraints mapping, identification of preliminary alternative routes, a public involvement program, modification of alternative routes following the public open-house meetings, and alternative route evaluation.

2.1 Study Area Delineation

The first step in the identification of alternative routes was to identify a study area. This area needed to encompass the Ponderosa Switching Station and the Grimes Substation, and include an area large enough that a reasonable number of geographically diverse alternative routes could be identified.

The Burns & McDonnell Project Manager and team reviewed The Roads of Texas Map (2008) and the aerial photography produced by the National Agriculture Imagery Program (NAIP 2012) to develop and identify the study area boundary for this project. The Burns & McDonnell Project Manager and a Geographic Information System (GIS) Specialist identified the approximate location of the Ponderosa Switching Station and the Grimes Substation and identified the major land use features in the vicinity of the proposed project such as the Sam Houston National Forest, Lake Conroe, residential developments, and major roadways and municipalities in the study area, as well as existing transmission lines, pipelines, and related features.

The purpose of delineating a study area for the project was to establish boundaries and limits for the information gathering process (i.e., identifying environmental and land use constraints). The delineation of the study area also allowed Burns & McDonnell to focus their evaluation on a specific area associated with the proposed project.

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2.2 Data Collection

2.2.1 Request for Information from Local, State, and Federal Officials/Agencies

One of the first data collection activities for this project was the development of a list of officials to be mailed a consultation letter regarding the proposed project. The purpose of the letters was to inform the various officials and agencies of the proposed project and give them the opportunity to provide information they may have regarding the study area. Burns & McDonnell utilized websites from area counties and various municipalities, as well as confirmation via telephone calls to identify local officials. Various state and federal agencies that may have potential permitting requirements for the proposed project were also contacted. Copies of correspondence sent to and received from the following local officials and departments, and the various state and federal regulatory agencies are included in Appendix A. State and Federal Agencies that were mailed a consultation letter include:

- Federal Emergency Management Agency
- Natural Resources Conservation Service
- U.S. Army Corps of Engineers
- U.S. Fish & Wildlife Service
- Federal Aviation Administration (Southwest Region)
- Sam Houston National Forest
- Texas Department of Transportation (Montgomery Area, Grimes Area, Environmental Affairs Division, and Aviation Division)
- Texas General Land Office (Survey / Asset Management)
- Texas Water Development Board
- Texas Parks & Wildlife Department
- Texas Historical Commission
- Brazos Valley Council of Governments
- Houston-Galveston Area Council of Governments
- San Jacinto River Authority
- Lake Conroe Area Chamber of Commerce
- Community Chamber of Commerce of East Montgomery County
- Navasota / Grimes County Chamber of Commerce
- Greater Conroe Economic Development Council
- Montgomery County Genealogical & Historical Society
- Historic Montgomery Business Association

- County Officials in: Grimes and Montgomery Counties (including Farm Bureaus)
- City Officials that were mailed a consultation letter include: Conroe, Montgomery, and Anderson.

The following independent school districts were mailed a consultation letter: Anderson-Shiro, Conroe, Iola, Magnolia, Montgomery, Navasota, New Caney, Richards, Splendora, and Willis.

Other data collection activities included file and record reviews conducted at various state regulatory agencies, a review of published literature, available GIS mapping, and frequent review of a variety of maps including recent color aerial photography, U.S. Geological Survey (USGS) topographic maps, various roadway maps, and county appraisal district land parcel boundary maps.

2.2.2 Field Reconnaissance Surveys

During the course of the above-mentioned data collection activities, Burns & McDonnell personnel conducted three separate reconnaissance surveys of the study area to confirm the findings of the previous research and data collection activities and to identify potential constraints that may not have been previously noted. The site visits were also utilized to assist in the route identification process. Reconnaissance surveys were conducted by visual observations from public roads and public ROW.

An initial reconnaissance survey of the study area was conducted on January 22, 2013. The purpose of the January survey was to observe and document the land use features within the study area and to confirm the location of existing transmission lines, pipelines, etc. The findings of the January reconnaissance survey were also used to confirm the study area boundary.

Additional reconnaissance surveys were conducted on March 25 through March 28, 2013, and on June 3 and June 4, 2013. The purpose of these surveys was to observe the preliminary alternative routes that were identified, make modifications to the preliminary alternative routes, as well as address comments that were received from the public open house meetings.

Results of the various data collection activities (i.e. request for information from local, state, and federal officials and agencies; file/records review; visual reconnaissance surveys, GIS mapping, etc.) are presented throughout Sections 3.0 and 7.0 of this report.

2.3 Constraints Mapping

The information collected during the data collection activities was utilized to develop an environmental and land use constraints map. The constraints map, various public maps, aerial photography, reconnaissance surveys, and agency correspondence were used to identify potential preliminary

alternative routes within the study area. The geographic locations of exclusionary areas, avoidance areas, and opportunity areas, as well as environmentally sensitive areas within the study area were mapped and considered during the proposed transmission line route identification. Burns & McDonnell was able to identify alternative routes that minimized and reduced potential impacts.

An exclusion area is defined as an area that cannot be crossed by a transmission line due to federal, state, or local laws, regulations, or ordinances. For example, the Federal Aviation Administration (FAA) is responsible for regulating most airport facilities. It is inappropriate for an overhead electric transmission line to cross a runway due to safety concerns. Therefore, an airport runway would be considered an exclusion area.

Avoidance areas include those areas for which there is no law or regulation that prohibits the crossing of a transmission line, but that would require special considerations or mitigation measures. A few examples of avoidance areas would be a park, federally owned land (i.e. U.S. Army Corps of Engineers (USACE) land), or environmentally sensitive areas (i.e. habitat for threatened or endangered species). Avoidance areas can be generally broken down into different levels (i.e. low, medium, and high) depending upon the type of constraint. For example, a forested wetland might be classified as a high avoidance area due to the requirement to obtain a permit and required mitigation measures for impacts, while an archeological site may be considered a low or medium avoidance area since actual disturbance of the site could likely be avoided by spanning the transmission line over the site. A transmission line route through a residential subdivision might not adhere to the policy of prudent avoidance if reasonable and otherwise acceptable alternatives exist in opportunity areas.

Once the exclusion and avoidance areas are identified and mapped as routing constraints, the remaining areas are considered opportunity areas. Opportunity areas are considered to be lower-impact areas, or those areas with a relatively low likelihood of containing existing natural, human, or cultural resources that could be negatively impacted by a transmission line.

2.4 Identification of Preliminary Alternative Routes

Upon completion of the various data collection activities and constraint mapping process, the next step in the project was to identify preliminary alternative routes to connect the project end points. Burns & McDonnell utilized the following to identify the alternative routes:

- Input received from the various correspondence with local officials and others as described in Section 2.2.1
- Input received from the three public open-house meetings

- Results of the visual reconnaissance activities of the study area
- Review of aerial photography
- Findings of the various data collection activities
- Environmental and land use constraints map
- Apparent property boundaries
- Existing compatible corridors
- Location of towns and cities

The preliminary alternative routes were identified in accordance with Texas Utilities Code § 37.056 (c)(4)(A)-(D) and PUCT Substantive Rule § 25.101, including the PUCT policy of prudent avoidance. It was Burns & McDonnell's intent to identify an adequate number of alternative routes which were environmentally acceptable, considering such factors as community values, park and recreational areas, historical and aesthetic values, environmental integrity, length of route parallel to or utilizing existing compatible ROWs, length of route parallel to apparent property boundaries, and the PUCT's policy of prudent avoidance. The preliminary alternative routes identified by Burns & McDonnell were then presented at three public open-house meetings.

2.5 Public Involvement Program

Once the preliminary alternative routes were identified, three public open-house meetings were held. The open-house meetings were held on March 25, March 26, and June 3, 2013. They were held at the below respective locations:

- March 25 – Roans Prairie: Roans Prairie Community Center, Roans Prairie, Texas
- March 26 – Conroe: Conroe City Hall, 300 West Davis Street, Conroe, Texas
- June 3 – Montgomery: Lone Star Elementary School, 16600 FM 2854 Road, Montgomery, Texas

Contract Land Staff, Inc. (CLS) mailed written notice of the meetings to all owners of property within 300 ft of the centerline for the preliminary alternatives routes (1,198 notices were mailed for the first two meetings, and an additional 230 landowners were noticed for the June Open-House). Notices were also mailed to the local officials and various state/federal regulatory agencies. A copy of the notice can be found in Appendix A.

Based on input received at and following the first two open-house meetings, Entergy decided to host a third public meeting.

At each open-house meeting, Entergy and Burns & McDonnell set up information stations in the meeting space. Each station was devoted to a particular aspect of the project and was staffed by representatives of Entergy (Welcome Table, CCN Certification Process, Purpose/Need of the Project, Engineering & Construction, & Landowner Identification and ROW), and Burns & McDonnell (Environmental and Routing). Each station had maps, illustrations, photographs, and/or text explaining each particular topic. Interested citizens and property owners were encouraged to visit each station in order, so that the entire process could be explained in the general sequence of project development. The information station format is advantageous because it allows attendees to process information in a more relaxed manner and also allows them to focus on their particular area of interest and ask specific questions. Furthermore, the one-to-one discussions with the Entergy & Burns & McDonnell Team encouraged more interaction from those citizens who might be hesitant to participate in a speaker-audience format.

Upon entering, attendees were asked to sign in and were handed a brochure and a questionnaire. The brochure included typical environmental and land use routing criteria, purpose and need for the project, structure type, and contact information for Entergy's local office. The questionnaire solicited comments on the proposed project as well as an evaluation of the information presented at the open-house meetings. Copies of these handouts can be found in Appendix B. Information from the public open-house meetings such as detailed maps, drawings of structure types, and related information is posted on the Entergy website at www.entergytexas.com\transmission.

In addition, computer stations were available at each meeting so that attendees could identify areas of interest (i.e. houses, environmentally sensitive areas, property boundary information, etc.) on the various routing maps and provide any comments.

After the public open-house meetings, Burns & McDonnell reviewed and evaluated each comment that was taken at the computer touch screens as well as took into account any additional comments from the questionnaire that was submitted at the meetings (or mailed at a later date) as well as all routing maps that had areas of interest identified by the attendees. Attendee comments were evaluated, considered, and factored into the overall evaluation of the alternative routes.

2.6 Modification of Alternative Routes Following the Open-House Meetings

Following the open-house meetings, 14 new links were added, 12 links were modified, and 13 links was eliminated as a result of input from the meeting attendees and additional evaluation of the preliminary alternative routes by Burns & McDonnell. The additions of new links occurred in various portions of the study area and are further described in Section 6.0.

2.7 Evaluation of the Alternative Routes

After the additions and modifications were made, a total of 440 alternative routes were identified. Burns & McDonnell then initiated a detailed evaluation of each alternative route/link. In evaluating the alternative routes/links, a variety of environmental and land use criteria were considered as well as the results of the public involvement program. Thirty-six environmental and land use criteria were utilized (Appendix C).

The analysis of each alternative route/link involved taking inventory and tabulating the number or quantity of each environmental and land use criterion located along the centerline of each route (i.e. number of stream crossings, the length across agricultural land, etc.). These criteria were developed and tailored to the specific characteristics that were identified in the study area. Burns & McDonnell identified a majority of these criteria within the study area during the reconnaissance surveys. For instance, Burns & McDonnell identified a number of county and farm-to-market (FM) roads as well as existing transmission lines as existing corridors within the study area. Paralleling and/or utilizing existing compatible corridors are typically considered positive criteria in the identification and evaluation of alternative routes.

Burns & McDonnell then evaluated the advantages and disadvantages of each alternative route. Potential environmental and land use impacts of the alternative routes are addressed in Section 7.0 of this document.

3.0 DESCRIPTION OF THE STUDY AREA

3.1 Constraints Mapping

After the study area boundary was identified (Figure 3-1), Burns & McDonnell initiated the information gathering process and the identification of environmental and land use constraints within the study area. The result of the information gathering process was a constraint map that showed environmental and land use constraints and was utilized in identifying preliminary alternative routes. The geographic locations of environmentally sensitive areas, restrictive areas, exclusion areas, land use constraints, etc. within the study area were identified on an aerial photograph base map (Figure 3-2) that is located in map pockets at the end of this document.

3.2 Natural Resources

The following is a description of the natural resources in the study area. These resources include topography, soils, hydrology, ecology, vegetation, threatened and endangered plant and animal species, wetlands, and wildlife. An evaluation of the potential impacts of this project upon these resources is described in Chapter 7.

3.2.1 Topography

The study area is situated within the Post Oak Savannah and the Blackland Prairies ecoregions. More specifically, the study area is located within, the Southern Blackland Prairie, the Southern Post Oak Savannah, and the Southern Tertiary Uplands. The northwestern portion of the study area, located in Grimes County, is within the Southern Post Oak Savannah ecoregion. This region has a larger forested area than the adjacent Southern Blackland Prairie ecoregion to the east and consists primarily of hardwood vegetation. The Southern Post Oak Savannah is a mix of post oak woods, improved pasture, and rangeland. The topography in this ecoregion is dissected and more irregular than areas to the north. The Southern Blackland Prairie ecoregion covers a large percentage of the central and southern portions of the study area, in both Grimes and Montgomery counties. The majority of this ecoregion is significantly more dissected than the rest of the study area; also, the elevations here are lower and there are less extensive areas of cropland. Land cover is primarily a mix of post oak woods and pasture land. The Southern Tertiary Uplands ecoregion occurs in the part of the central and primarily the eastern portion of the study area in Montgomery County. This ecoregion is home to the longleaf pine, and some American beech or magnolia-beech-loblolly pine forests. The portion of the study area containing the Southern Tertiary Uplands ecoregion has more pine forests than the oak-pine and pasture land cover to the north and west. This region is somewhat hilly and flattens to the south. The soils are generally well drained (EPA 2010).

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3.2.2 Soils

Land use patterns in the study area are influenced by the suitability and limitations of soil properties for development. The U.S. Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS) has surveyed and mapped the soil units in Grimes and Montgomery counties based on the physical properties and composition of the soil and the amount of slope and drainage where the soil is located. These soil maps are helpful in planning future land use and development.

Specific soil classifications are called soil map units. Soil map units describe the soil characteristics in a specific geographic area. The northwestern portion of the study area is dominated by Falba and Gomery soil series. The central portion of the study area is dominated by Frelsburg, Annona, Huntsburg, and Fetzer soil series. The southeastern portion of the study area is dominated by Depcor, Woodville, Boy, and Conroe soil series. Table 3-1 provides a detailed description of the dominant soil associations located in the study area.

Prime farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops. It also is well suited for cropland, pastureland, rangeland, or forestland. It has the soil quality needed to economically produce sustained high yields of crops when treated and managed, including water management, according to acceptable farming methods (NRCS 2012a). Frelsburg soils are the only soils in the study area that are considered to be prime farmland.

Table 3-1: Major Soil Associations within Study Area

Soil Map Units	Characteristics
Falba	• Nearly level to gently sloping • Moderately well drained, slowly permeable soils • Shallow fine sandy loam, over clay soils • Not prime farmland
Gomery	• Nearly level to gently sloping • Somewhat poorly drained, moderately low to moderately high permeable soils • Moderately deep, loamy fine sandy soils • Not prime farmland
Frelsburg	• Very gently sloping to very steep • Moderately well drained, very slowly permeable soils • Shallow, clayey soils • All areas are prime farmland
Annona	• Very gently sloping • Moderately well drained, moderately permeable soils • Shallow, sandy loam soils • Not prime farmland

Soil Map Units	Characteristics
Huntsburg	• Very gently sloping to very steep • Moderately well drained, very slowly permeable soils • Shallow, loamy fine sand over clay soils • Not prime farmland
Fetzer	• Little to moderate sloping • Somewhat poorly drained, moderately permeable soils • Moderately deep, loamy fine sandy soils • Associated with interfluves on coastal plains • Not prime farmland
Depcor	• Very gently sloping to very steep • Moderately well drained, moderately permeable soils • Moderately deep loamy fine sandy soils • Not prime farmland
Woodville	• Little to moderate sloping • Somewhat poorly drained, moderately permeable soils • Fine sandy loam, above deep clay soils • Not prime farmland
Boy	• Moderately sloping • Somewhat poorly drained, moderately permeable soils • Deep, sandy soils • Not prime farmland
Conroe	• Moderately sloping • Moderately well drained, moderately permeable soils • Very deep, loamy fine sandy soils • Not prime farmland

Source: NRCS, 2012b

3.2.3 Hydrology

According to NRCS GIS data, the study area receives an average of approximately 40 inches of rain per year. The study area falls within four watersheds: the Navasota, the West Fork San Jacinto, the Spring, and the Lower Brazos-Little Brazos. Figure 3-2 shows the rivers and streams found within the study area.

One of the main drainages through Grimes and Montgomery counties is the West Fork San Jacinto River, including Lake Creek and Lake Conroe and various tributaries. Lake Creek runs south and then turns east through the study area until it joins the West Fork San Jacinto River. Lake Creek is identified by TPWD as being an Ecologically Significant Stream Segment (ESSS).Lake Conroe is in the southeastern portion of the study area and drains into the West Fork San Jacinto River. Other drainages of the West Fork San Jacinto River located within the study area include Little Lake Creek, Atkins Creek, Town Creek, Stewart Creek, Rush Creek, Base Creek, Sand Branch, Egypt Creek, White Oak Creek, Flagtail Creek, Garretts Creek, Kidhaw Branch, Geter Creek, Bums Creek, Haynie Creek, Little Caney Creek, Johns Creek, Sand Creek, Caney Creek, Landrum Creek, Spring Branch, Mound Creek, and Fish Creek. Mill Creek runs through the study area and also contributes as drainage for the West Fork San Jacinto River but it connects with the West Fork San Jacinto River approximately 55 miles outside of the study area. Only Mill Creek, Hurricane Creek, and Kickapoo Creek flow through the study area from this branch of the river.

The other main drainage through Grimes County is the Brazos River and its various tributaries. This river runs south just outside of the study area, but many of its tributaries are located within the study area. Other drainages of the Brazos River include the Navasota River, Gibbons Creek, Peach Creek, Grassy Creek, Sulfur Creek, Rocky Creek, Spring Branch, Pine Creek, Jack Branch, Little Flock Creek, Sand Creek, Turkey Creek, Holland Creek, Spring Creek, Thomas Creek, Cedar Creek, Sandy Creek, Little Grassy Creek, Red Gully, Elm Grove Creek, Rocky Creek, and Beason Creek.

According to the Texas Water Development Board (TWDB) Montgomery County is part of the Region H Regional Water Planning Area. This area relies on both surface and groundwater sources. Surface water is used primarily for steam electric power in Montgomery County. Groundwater is primarily used for municipal uses with secondary uses including industrial and agricultural (TWDB 2012). Its total existing water supply was 2,621,660 acre-ft in 2010, and is projected to decrease 0.6 percent to 2,605,917 acre-ft in 2060. Surface water supplies, approximately 70 percent of the total water supply to the region, comes from the Lake Livingston/Wallisville System in the Trinity River Basin and run-of-river water rights in the Trinity and Brazos river basins. The Gulf Coast Aquifer is the source of most of the ground water in the region, with 30 percent of the total water supply coming from the Gulf Coast aquifer (TWDB 2012).

According to the TWDB, Grimes County is part of the Brazos (Region G) Regional Water Planning Area. This area relies on both surface and groundwater sources. Its total existing water supply was 1,163,224 acre-ft in 2010, decreasing 1.5 percent to 1,146,400 acre-ft in 2060. Surface water supplies to the region come from 40 major reservoirs located in the Brazos Region. There are six major aquifers in the region; however, the majority of the study area is located within the Gulf Coast Aquifer. Groundwater accounted for 31 percent of the region's supplies in 2010 (TWDB 2012).

The Gulf Coast Aquifer is a major aquifer paralleling the Gulf of Mexico coastline from the Louisiana border of Texas to the Mexico border. Water is contained in isolated patches of alluvium averaging 1,000 ft thick composed of discontinuous sand, silt, clay and gravel beds. Water ranges from fresh to slightly saline, containing from approximately 500 to more than 10,000 milligrams per liter of total dissolved solids. High levels of radionuclides, thought to be naturally occurring, are found in some wells in South Texas. The Aquifer is used for municipal, industrial, and irrigation purposes (George, Mace, & Petrossian 2011).

Many lakes and reservoirs occur within the study area. Listed alphabetically, they include: Artesian Lake, Bluebonnet Farms Lake, Country Club Lake, Deer Lake, Dobbin Lake, Farm Lake, Fling Pond, Grand Lake, Hideaway Lake, Johnson Lake, Kim Lake, Lago Del Bosque, Koehl Lake, Lake Bonanza, Lake Conroe, Lake Forest, Lake Forest Falls, Lake Lorraine, Lake Seventyseven, Micrea Lake, Mitchell Lake, Moon Lake, Near Kim Lake, Old Lake 177, Peel Lake, Pevenhouse Lake, Pine Lake, Prescott Lake, Rampy Lake, Rushing Springs Lake, Scott Lake, Sneed Lake, Stanley Lake, Stewart Lake, Stoneham Lake, Tri Lake Number 1, Ward-Haworth Lake, Weaver Lake, and Yarboro Lake. The TWDB has no current plans for constructing any new reservoirs in the near future (SRAJ). Both Grimes and Montgomery counties participate in the National Flood Insurance Program (NFIP) (FEMA 2012)

3.2.4 Vegetation

Three ecological areas, as defined by the TPWD, are located within the study area. These areas include the pineywoods, the post oak savannah, and the blackland prairies. There are six major vegetative communities that exist within these ecological areas. They are the post oak forest/woods/parks/grassland mosaic, the willow oak-water oak-blackgum forest, the elm- hackberry parks/woods, the bald cypress-water tupelo swamp, the young forest/grassland, and the pine-hardwood forest.

Commonly associated species of the post oak forest/woods/parks/grassland mosaic plant community include blackjack oak (*Quercus marilandica*), post oak (*Quercus stellata*), eastern redcedar (*Juniperus virginiana*), mesquite (*Prosopis glandulosa*), black hickory (*Carya texana*), live oak (*Quercus*

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virginiana), sandjack oak (*Quercus incana*), cedar elm (*Ulmus crassifolia*), hackberry (*Celtis laevigata*), yaupon (*Ilex vomitoria*), poison oak (*Toxicodendron pubescens*), American beautyberry (*Callicarpa americana*), hawthorn (*Crataegus virdis*), supplejack (*Berchemia scandens*), trumpet creeper (*Campsis radicans*), dewberry (*Rubus spp.*), coral-berry (*Symphoricarpos orbiculatus*), little bluestem (*Schizachyrium scoparium*), silver bluestem (*Bothriochloa saccharoides*), sand lovegrass (*Eragrostis trichodes*), beaked panicum (*Panicum anceps*), three-awn (*Aristida spiciformis*), spranglegrass (*Chasmanthium sessiliforum*), and sessileleaf tickclover (*Desmodium sessilifolium*) (McMahan et al. 1984).

Commonly associated species of the willow oak-water oak- blackgum forest plant community include American beech (*Fagus grandifolia*), overcup oak (*Quercus lyrata*), chestnut oak (*Quercus michauxii*), cherrybark oak (*Quercus pagoda*), American elm (*Ulmus americana*), sweetgum (*Liquidambar styraciflua*), American sycamore (*Platanus occidentalis*), southern magnolia (*Magnolia grandiflora*), white oak (*Quercus alba*), black willow (*Salix nigra*), bald cypress (*Taxodium distichum*), swamp laurel oak (*Quercus laurifolia*), hawthorn, dwarf palmetto (*Sabal minor*), common elderberry (*Sambucus canadensis*), southern arrowwood (*Viburnum dentatum*), poison oak, supplejack, trumpet creeper, crossvine (*Bignonia capreolata*), greenbriar (*Smilax rotundifolia*), blackberry (*Rubus spp.*), rhomboid copperleaf (*Acalypha rhomboidea*), and St. Andrew's cross (*Ascyrum hypericoides*) (McMahan et al. 1984).

Commonly associated species of the elm-hackberry parks/woods plant community include mesquite, post oak, woollybucket bumelia (*Bumelia lanuginosa*), honey locust (*Gleditsia Triacanthos*), coral-berry, pasture haw (*Crataegus spathulata*), elbowbush (*Forestiera pubescens*), Texas pricklypear (*Opuntia lindheimeri*), tasajillo (*Opuntia leptocaulis*), dewberry, silver bluestem, buffalograss (*Bouteloua dactyloides*), western ragweed (*Ambrosia psilostachya*), giant ragweed (*Ambrosia trifida*), goldenrod (*Solidago spp.*), frostweed (*Verbesina virginica*), ironweed (*Vernonia spp.*), prairie parsley (*Polytaenia nuttallii*), and broom snakeweed (*Xanthocephalum spp.*) (McMahan et al. 1984).

Commonly associated species of the bald cypress-water tupelo swamp plant community include water oak (*Quercus nigra*), water hickory (*Carya aquatic*), swamp blackgum (*Nyssa sylvatica var. biflora*), red maple (*Acer rubrum*), swamp privit (*Forestiera acuminate*), buttonbush (*Cephalanthus occidentalis*), possum haw (*Viburnum nudum*), water elm (*Planera aquatica*), black willow, eardrop vine (*Brunnichia ovata*), supplejack, trumpet creeper, climbing hempweed (*Mikania scandens*), bog hemp (*Boehmeria cylindrica*), water fern (*Azolla caroliniana*), duckweed (*Lemna spp.*), water hyacinth (*Eichornia*

crassipes), bladderwort (*Utricularia spp.*), beggar-ticks (*Bidens discoidea*), water paspalum (*Paspalum fluitans*), and St. John's wort (*Hypericum walteri*) (McMahan et al. 1984).

Commonly associated species of the young forest/grassland plant community include various combinations and classes of pine (*Pinus spp.)* and regrowth southern red oak (*Quercus falcata*), sweetgum, post oak, white oak, black hickory, blackgum (*Nyssa sylvatica*), elm (*Ulmus spp.*), hackberry (*Celtis spp.*), and water oak, resulting from recent harvesting of pine or pine-hardwood forest and subsequent establishment of young pine plantation or young pine-hardwood forest. Shrubs include hawthorn (*Crataegus spp.*), poison oak, sumac (*Rhus spp.*), holly (*Ilex spp.*), wax myrtle (*Myrica cerifera*), blueberry (*Vaccinium spp.*), blackberry (*Rubus louisianus*), and red bay (*Persea borbonia*) (McMahan et al. 1984).

Commonly associated species of the pine-hardwood forest plant community include shortleaf pine (*Pinus echinata*), water oak, white oak, southern red oak, winged elm (*Ulmus alata*), beech, blackgum, magnolia, American beautyberry, American hornbeam (*Carpinus caroliniana*), flowering dogwood (*Cornus florida*), yaupon, hawthorn, supplejack, Virginia creeper (*Parthenocissus quinquefolia*), wax myrtle, red bay, sassafras (Sassafras albidum), southern arrowwood, poison oak, greenbriar (*Smilax spp.*), blackberry, loblolly pine (*Pinus taeda*), black hickory, sandjack oak, common persimmon (*Diospyros virginiana*), sweetgum, beaked panicum, spranglegrass, Indiangrass (*Sorghastrum avenaceum*), switchgrass (*Panicum virgatum*), three-awn (*Aristida spp.*), bushclover (*Lespedeza spp.*), tickclover (*Desmodium spp.*), blackjack oak, sand post oak (*Quercus margaretta*), yellow jessamine (*Gelsemium sempervirens*), slender bluestem (*Schizachyrium tenerum*), broomsedge bluestem (*Andropogon virginicus*), and little bluestem (McMahan et al. 1984).

3.2.5 Threatened and Endangered Plant Species

According to TPWD and U.S. Fish and Wildlife Service (USFWS), the Navasota ladies' tresses (*Spiranthes parksii*) is the only state or federally-listed threatened or endangered plant species that is known or likely to occur within Grimes and Montgomery Counties. TPWD also indicates five additional plant species that are not currently listed as threated or endangered but are still considered rare species. These five rare species are the bristle nailwort (*Paronychia setacea*), Correll's false dragon-head (*Physostegia correllii*), the branched gay-feather (*Liatris cymosa*), the Navasota false foxglove (*Agalinis navasotensis*), and the Texas meadow-rue (*Thalictrum texanum*) (TPWD 2011).

TPWD indicated in its April 8, 2013, letter (Appendix A) that the overcup oak series (*Quercus lyrata Series*), and the loblolly pine- post oak- blackjack oak- farkleberry series are listed as rare natural communities within the study area.

3.2.6 Wetlands

Wetlands are especially valued because of their location on the landscape, the wide variety of ecological functions they perform, the ability for storing or conveying floodwaters, and the uniqueness of their vegetation and animal communities. Wetlands also provide high-quality habitats for wildlife, including foraging and nesting areas for birds and spawning and nursery areas for fish sites for educational research. Figure 3-2 shows the USFWS National Wetland Inventory (NWI) data where it is digitally available within the study area.

Based on NWI maps, there are seven distinctive types of wetland categories in the study area. These seven wetland types fall into two broad categories, palustrine and riverine. The palustrine system includes all nontidal wetlands dominated by trees, shrubs, and emergents (herbaceous plants). The riverine system includes all wetlands and deep-water habitats contained within a channel except for wetlands dominated by trees, shrubs, persistent emergents, emergent moss, or lichens and habitat with water containing ocean-derived salts in excess of 0.5% (Cowardin et al. 1979). The study area contains four main groups of palustrine wetlands: emergent, forested/shrub, ponds, and lakes. The riverine wetlands include intermittent streambed, lower perennial unconsolidated shore, and lower perennial unconsolidated bottom. Most of these wetlands are associated with the streams and lakes within the study area.

3.2.7 Wildlife

The proposed study area is primarily used for pasture and range land, with pockets of scattered woodland throughout the study area. Much of the study area, outside of the city limits, is open and available to native wildlife.

Mammals that are likely to occur within the study area include the big brown bat (*Eptesicua fuscus*), black bear (*Ursus americanus*), eastern pipistrelle (*Pipistrellus subfalvus*), evening bat (*Nycticeius humeralis*), hoary bat (*Lasiurus cinereus*), northern yellow bat (*Lasiurus intermedius*), rafinesque's big-eared bat (*Corynorhinus rafinesquii*), river otter (*Lutra canadensis*), seminole bat (*Lasiurus seminolus*), silver-haired bat (*Lasionycteris noctivagans*), southeastern myotis (*Myotis austroriparius*), bobcat (*Lynx rufus*), coyote (*Canis latrans*), raccoon (*Procyon lotor*), opossum (*Didelphis virginiana*), striped skunk (*Mephitis mephitis*), and the fox squirrel (*Sciurus niger*) (TPWD 2012a).

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Birds commonly encountered within the study area include the American kestrel (*Falco sparverius*), Attwater's prairie chicken (*Tympanuchus cupido attwateri*), bald eagle (*Haliaeetus leucocephalus*), blue jay (*Cyanocitta cristata*), burrowing owl (*Athene cunicularia*), chimney swift (*Chaetura pelagica*), downy woodpecker (*Picoides pubescens*), eastern bluebird (*Sialia sialis*), eastern screech-owl (*Megascops asio*), Eskimo curlew (*Numenius borealis*), Mississippi kite (*Ictinia mississippiensis*), northern cardinal (*Cardinalis cardinalis*), northern flicker (*Colaptes auratus*), northern harrier (*Circus cyaneus*), painted bunting (*Passerina ciris*), pied-billed grebe (*Podilymbus podiceps*), pine warbler (*Dendroica pinus*), red-bellied woodpecker (*Melanerpes carolinus*), red-cockaded woodpecker (*Picoides borealis*), red-shouldered hawk (*Buteo lineatus*), rock pigeon (*Columba livia*), ruby-throated hummingbird (*Archilochus colubris*), scissor-tailed flycatcher (*Tyrannus forficatus*), whooping crane (*Grus Americana*), yellow-billed cuckoo (*Coccyzus americanus*), and northern mockingbird (*Mimus polyglottos*) (TPWD 2012a).

Amphibians and reptiles likely to occur within the study area include the southern leopard frog (*Rana sphenocephala*), eastern box turtle (*Terrapene carolina*), ornate box turtle (*Terrapene ornate*), red-eared slider (*Trachemys scripta elegans*), tiger salamander (*Ambystoma tigrinum*), bronze frog (*Rana clamitans*), marbled salamander (*Ambystoma opacum*), green anole (*Anolis carolinensis*), bullsnake (*Pituophis catinefer sayi*), Louisiana milk snake (*Lampropeltis triangulum amaura*), Louisiana pine snake (*Pituophis ruthveni*), southern copperhead (*Agkistrodon contortrix*), timber rattlesnake (*Crotalus horridus*), western cottonmouth (*Agkistrodon piscivorus leucostoma*), and American alligator (*Alligator mississippiensis*) (TPWD 2012a).

Fish likely to occur within the study area lakes and rivers/creeks include the black buffalo (*Ictiobus niger*), black bullhead (*Ameiurus melas*), black crappie (*Pomoxis nigromaculatus*), blacktail shiner (*Cyprinella venusta*), fathead minnow (*Pimephales promelas*), flier (*Centrarchus macropterus*), golden shiner (*Notemigonus crysoleucas*), grass carp (*Ctenopharyngodon idella*), Guadalupe bass (*Micropterus treculii*), longnose gar (*Lepisosteus osseus*), paddlefish (*Polyodon spathula*), spotted gar (*Lepisosteus oculatus*), largemouth bass (*Micropterus salmoides*), bluegill (*Lepomis macrochirus*), longear sunfish (*Lepomis megalotis*), red shiner (*Cyprinella lutrensis*), redfin shiner (*Lythrurus umbratilis*), redbreast sunfish (*Lepomis auritus*), redear sunfish (*Lepomis microlophus*), green sunfish (*Lepomis cyanellus*), bowfin (*Amia calva*), threadfin shad (*Dorosoma petenense*), flathead catfish (*Pylodictis olivaris*), white crappie (*Pomoxis annularis*), freshwater drum (*Aplodinotus grunniens*), channel catfish (*Ictalulrus punctatus*), smallmouth bass (*Micropterus dolomieu*), smallmouth buffalo (*Ictiobus bubalus*), spotted bass (*Micropterus punctulatus*), striped bass (*Morone saxatilis*), white bass

(*Morone chrysops*), yellow bass (*Morone mississippiensis*), yellow bullhead (*Ameiurus natalis*), and walleye (*Sander vitreum*) (TPWD 2012a).

Various species throughout the study area are considered recreationally or commercially valuable. These species provide human benefits as a result of both nonconsumptive recreational and hunting activities. Nonconsumptive activities include bird-watching, wildlife photography, etc. These types of activities apply to all wildlife within the study area. The majority of recreational activity in the study area consists of fishing and hunting. Lake Conroe provides recreational fishing and hunting and is the most concentrated area of recreational and commercially valuable species in the study area. Major rivers such as the Brazos River and the West Fork San Jacinto River provide recreational fishing but have no known commercial fisheries. Common game fish in many of the lakes and reservoirs scattered throughout the study area include largemouth bass, white bass, channel catfish, white crappie, sunfish, and walleye (TPWD 2012a).

3.2.8 Threatened and Endangered Animal Species

According to TPWD and USFWS, 12 Federally listed and 23 State listed threatened or endangered species are known or likely to occur in Grimes or Montgomery counties (Table 3-2). Three additional species, the Arctic peregrine falcon, the Sprague's pipit, and the sharpnose shiner are listed as candidates by the USFWS or TPWD. All known occurrences of State and Federally listed threatened and endangered species locations as recorded by TPWD are depicted on Table 3-2.

Table 3-2: Protected Species that Potentially Occur within the Study Area

Species	State Status	Federal Status	Counties of Occurrence	Potential for Occurrence in Study Area*
American Peregrine Falcon (*Falco peregrinus anatum*)	Threatened	Delisted	Grimes, Montgomery	Migrate through
Arctic Peregrine Falcon (*Falco peregrinus tundrius*)	Candidate	Delisted	Grimes, Montgomery	Migrate through
Bald Eagle (*Haliaeetus leucocephalus*)	Threatened	Delisted	Grimes, Montgomery	Likely
Interior Least Tern (*Sterna antillarum*)	Endangered	Endangered	Grimes	Likely
Peregrine Falcon (*Falco peregrinus*)	Threatened	Delisted	Grimes, Montgomery	Migrate through
Piping Plover (*Charadrius melodus*)	Threatened	Threatened	Montgomery	Possibly during winter months

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Species	State Status	Federal Status	Counties of Occurrence	Potential for Occurrence in Study Area*
Red-cockaded Woodpecker (*Picoides borealis*)	Endangered	Endangered	Grimes, Montgomery	Likely
Sprague's Pipit (*Anthus spragueii*)	None	Candidate	Grimes, Montgomery	Likely, during winter months
White-faced Ibis (*Plegadis chihi*)	Threatened	None	Grimes, Montgomery	Likely
Whooping Crane (*Grus Americana*)	Endangered	Endangered	Grimes, Montgomery	Migrate through
Wood Stork (*Mycteria Americana*)	None	Threatened	Grimes, Montgomery	Not Likely
Blue Sucker (*Cycleptus elongates*)	Threatened	None	Grimes	Not Likely
Creek chubsucker (*Erimyzon oblongus*)	None	Threatened	Montgomery	Likely
Paddlefish (*Polyodon spathula*)	None	Threatened	Montgomery	Likely
Sharpnose shiner (*Notropis oxyrhynchus*)	None	Candidate	Grimes	Likely
Louisiana black bear (*Ursus americanus luteolus*)	Threatened	Threatened	Grimes, Montgomery	Possible
Rafinesque's big-eared bat (*Corynorhinus rafinesquii*)	Threatened	None	Montgomery	Likely
Red wolf (*Canis rufus*)	Endangered	Endangered	Grimes, Montgomery	Not Likely
False spike mussel (*Quadrula mitchelli*)	Threatened	None	Grimes	Not Likely
Louisiana pigtoe (*Pleurobema riddellii*)	Threatened	None	Montgomery	Not Likely
Sandbank pocketbook (*Lampsilis satura*)	Threatened	None	Montgomery	Likely
Smooth pimpleback (*Quadrula houstonensis*)	Threatened	Candidate	Grimes	Likely
Texas fawnsfoot (*Truncilla macrodon*)	Threatened	Candidate	Grimes	Not Likely
Texas pigtoe (*Fusconaia askewi*)	Threatened	None	Montgomery	Likely
Alligator snapping turtle (*Macrochelys temminckii*)	Threatened	None	Grimes, Montgomery	Likely
Louisiana pine snake (*Pituophis ruthveni*)	Threatened	Candidate	Grimes, Montgomery	Likely

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Species	State Status	Federal Status	Counties of Occurrence	Potential for Occurrence in Study Area*
Texas Horned Lizard (*Phrynosoma cornutum*)	Threatened	None	Grimes, Montgomery	Not Likely
Timber/Canebrake rattlesnake (*Crotalus horridus*)	Threatened	None	Grimes, Montgomery	Likely

Sources: USFWS, 2013 and TPWD, 2011

*Burns & McDonnell's professional assessment of the occurrence of these species in the study area

Only those species listed as threatened or endangered by USFWS are protected by Federal law. A brief description of habitat used by the protected species listed by TPWD and USFWS is provided below.

All three sub-species of peregrine falcon inhabit open areas usually associated with high cliffs and bluffs over rivers and coasts but they may nest on buildings and bridges in urban areas. These falcons are observed most often during the spring and fall migration, especially in areas with high concentrations of shorebirds and waterfowl (TPWD 2012b).

During winter, bald eagles congregate near rivers and reservoirs with open water and often near large concentrations of waterfowl. They usually perch within a riparian corridor or along lake shores where there is limited human activity. In addition to feeding on fish, bald eagles also feed on dead or crippled waterfowl, small mammals and carrion. During winter nights, bald eagles may congregate at communal roosts (TPWD 2012c).

Interior least terns nest in small colonies on sandbar islands in major rivers and sand and gravel pits. Suitable nesting sites have sparse or no vegetation and are well back from the water line. Interior least terns forage along shorelines, sandbar margins, backwaters, and chutes usually within a few hundred meters of the nesting colony. Their diet consists almost entirely of small fish, primarily minnows (TPWD 2012d).

The piping plover is a wintering migrant along the Texas Gulf Coast; it prefers beaches and bayside mud or salt flats (TPWD 2012e).

Whooping cranes nest in Canada and winter in coastal marshes in Texas. The migration route of this population passes through north central Texas and migrating whooping cranes often are sighted at and along reservoirs, large ponds, rivers, and wetlands at stop-over habitats. They feed on crustaceans, mollusks, fish, berries, small reptiles and aquatic plants (TPWD 2012f).

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The Red-cockaded woodpecker typically nests in the cavities of pines that are 60 years or older. This bird is also known to forage in pines that are around 30 years old. This woodpecker prefers longleaf, shortleaf, and loblolly pines (TPWD 2011).

The Sprague's pipit is only in Texas during its migration and for a portion of the winter months. It is typically in Texas from mid-September to early April. This bird is strongly tied to the native upland prairie and is locally common in coastal grassland. It is less common further west. It prefers a large patch of grassland and will not nest in smaller patches, it is also avoids the edges of grassland habitats (TPWD 2011).

The white-faced ibis is known to prefer freshwater marshes, sloughs, and irrigated rice fields. It can sometimes be found in brackish and saltwater habitats as well. The white-faced ibis nests in marshes; it prefers to be low to the ground, typically nesting in low trees, on the ground in bulrushes or reeds, or on floating mats (TPWD 2011).

The wood stork is known to forage in prairie ponds, flooded pastures or fields, ditches, and other shallow standing water, including saltwater. It usually nests communally in tall snags and sometimes associates with other wading birds. The wood stork breeds in Mexico then moves into the Gulf States in search of mud flats and other wetland areas. These wetland areas can be associated with forested areas as well. These birds formerly nested in Texas, but there are no breeding records since 1960 (TPWD 2011).

The creek chubsucker is found in tributaries of the Red, Sabine, Neches, Trinity and San Jacinto Rivers. It prefers small rivers and creeks of various types. It is seldom in impoundments, but prefers to live in the headwaters; it seldom occurs in springs. Younger fish typically live in the headwater rivulets or mashers. These fish spawn in the river mouths or pools, riffles, lake outlets, or upstream creeks (TPWD 2011).

The paddlefish prefers large, free flowing rivers. It will also frequent impoundments if they provide access to spawning sites. These fish spawn in fast, shallow water over gravel bars. This spawning area allows larvae to drift from reservoir to reservoir (TPWD 2011).

The blue sucker resides in larger portions of major rivers in Texas. It prefers the channels and flowing pools with a moderate current and a river bottom of exposed bedrock in combination with hard clay, sand and gravel. The adults winter in deep pools and move upstream in spring to spawn on riffles (TPWD 2011).

The sharpnose shiner is endemic to Brazos River drainage. It was also introduced to the adjacent Colorado River drainage. They are typically found in the turbid waters of sandy main channels of the Brazos River with moderate depths and current velocities (Marks 1999).

Louisiana black bear is possible in these areas as a transient. It prefers bottomland hardwoods and large tracts of inaccessible forested areas (TPWD 2011).

Rafinesque's big-eared bat is known to roost in the cavities of trees, particularly in the bottomland hardwoods. It will also roost in concrete culverts and abandoned man-made structures (TPWD 2011).

Wolves inhabit forests, brushlands, and grasslands but prefer broken, open country in which suitable "hideouts" and denning sites are available. The red wolf has been extirpated from this area. It was formerly known throughout the eastern half of Texas in brushy and forested areas, as well as coastal prairies (TPWD 2011).

The false spike mussel is possibly extirpated in Texas. It probably resides in medium to large rivers. It prefers river bottoms of mud through mixtures of sand, gravel and cobble. It is believed to be found in the Rio Grande, Brazos, Colorado, and Guadalupe (historic) River basins (TPWD 2011).

Louisiana pigtoe is found in streams and moderate-size rivers, usually flowing water on substrates of mud, sand, and gravel. It is not generally known in impoundments. It is known to reside in the Sabine, Neches, and Trinity (historic) River basins (TPWD 2011).

Sandbank pocketbook is typically found in small to large rivers with moderate flows and a swift current. It prefers gravel, gravel-sand and sandy river bottoms. It is found in east Texas in the San Jacinto River basins and the Neches River (TPWD 2011).

The smooth pimpleback is found in small to moderate streams and rivers as well as moderate size reservoirs. It prefers river bottoms of mixed mud, sand, and fine gravel, and tolerates very slow to moderate flow rates. It appears not to tolerate dramatic water level fluctuations, scoured bedrock substrates, or shifting sand bottom. It is found in the lower Trinity (questionable), Brazos, and Colorado River basins (TPWD 2011).

There is little known about the Texas fawnsfoot. It is believed to live in rivers and larger streams, and is thought to be intolerant of impoundments, flowing rice irrigation canals. It prefers river bottoms of sand, gravel, and perhaps sandy-mud bottoms in moderate flows. It is thought to live in the Brazos and Colorado River basins (TPWD 2011).

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The Texas pigtoe lives in rivers with mixed mud, sand, and fine gravel in protected areas associated with fallen trees or other structures. It is known to reside in east Texas River basins, particularly the Sabine, Trinity and San Jacinto Rivers (TPWD 2011).

The alligator snapping turtle prefers perennial water bodies. It lives in the deep water of rivers, canals, lakes, oxbows, swamps, bayous, and ponds near deep running water. It sometimes also enters brackish coastal waters. It is usually found in water with mud bottoms and abundant aquatic vegetation. This species may migrate several miles along rivers. It is active from March to October and typically breeds from April to October (TPWD 2011).

The Louisiana pine snake lives in mixed deciduous and longleaf pine woodlands. It is known to breed from April to September (TPWD 2011).

Texas horned lizards are found in arid and semiarid habitats in open areas with sparse plant cover (Davis and Schmidly 1994). They feed on ants and other small insects and are found on loose sand or loamy soils and dig burrows for hibernation and nesting. It is known to breed from March- September (TPWD 2011).

The timber/canebrake rattlesnake is found in swamps, floodplains, upland pine and deciduous woodlands, riparian zones, and abandoned farmland. It lives in limestone bluffs, sandy soil, or black clay. This snake prefers dense ground cover such as palmetto or grapevines (TPWD 2011).

TPWD indicated in its April 8, 2013, letter (Appendix A) that the red-cockaded woodpecker, listed as endangered by the USFWS, and the bald eagle, listed as threated by TPWD, have been documented as present within the study area. Additionally, TPWD listed colonial waterbird rookeries as a special feature within the study area.

Colonial waterbird populations are key environmental indicators of estuary health and productivity in Texas. They represent the top of the food chain and reflect the system's overall health. Colonial waterbirds are usually found on coastal beaches, bays, and estuaries; however, several species occupy freshwater habitats such as the Interior Least Tern which is known to occur within the study area. Their diet consists mainly of fish and aquatic invertebrates (USFWS 2002).

3.3 Human Resources

The following is a description of the human resources located in the study area. Topics addressed include patterns of land use, visual character, and cultural resources.